

## **REMARKS**

### **I. Introduction**

Claims 11, 13, 14 and 18 to 23 are pending in the present application. In view of the foregoing amendments and the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

Applicants thank Examiner for considering the Information Disclosure Statement filed on May 4, 2009.

### **II. Rejection of Claims 11, 13, 14, and 18 to 23 Under 35 U.S.C. § 112**

Regarding the rejection of claims 11, 13, 14, and 18 to 23 Under 35 U.S.C. § 112, first and second paragraphs, although Applicants do not necessarily agree with the merits of the rejections, to facilitate matters, claims 11, 13 and 22 have been amended without prejudice to recite that **the non-magnetic intermediate layer of the layer arrangement and the second non-magnetic intermediate layer of the magneto-resistive layer stack at least one of (a) are made of the same material and (b) have a substantially equal thickness**, thereby obviating the present rejections. Support for these amendments may be found, for example, on page 4, lines 5 to 13 of the Specification. Accordingly, withdrawal of these rejections is respectfully requested.

### **III. Rejection of Claims 11, 13, 15, 17 and 20 to 23 Under 35 U.S.C. § 103(a)**

Claims 11, 13, 15, 17 and 20 to 23 were rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of U.S. Patent No. 5,841,611 ("Sakakima et al.") and U.S. Patent No. 6,144,524 ("Haratani et al."). It is respectfully submitted that the combination of Sakakima et al. and Haratani et al. does not render these claims unpatentable for at least the following reasons.

As an initial matter, claims 15 and 17 were canceled in response to the Final Office Action of February 2, 2009, thereby rendering moot the rejection with respect to these claims.

Regarding claim 11, this claim relates to a magneto-resistive layer system including: a magneto-resistive layer stack; and at least one layer arrangement situated in an environment of the magneto-resistive layer stack working on the basis of one of a GMR effect and an AMR effect, which generates a resulting

magnetic field acting upon the magneto-resistive layer stack, the layer arrangement including a first magnetic layer, a second magnetic layer, and a non-magnetic intermediate layer separating the first magnetic layer and the second magnetic layer from one another, the first magnetic layer and the second magnetic layer being ferromagnetically exchange-coupled via the intermediate layer. Either (a) the first magnetic layer is a magnetically soft layer, made of one of CoFe, Co and magnetic alloys containing these materials, and the second magnetic layer is a magnetically hard layer, made of CoSm; or (b) the first magnetic layer is a magnetically hard layer, made of CoSm, and the second magnetic layer is a magnetically soft layer, made of one of CoFe, Co and magnetic alloys containing these materials. The non-magnetic intermediate layer is made of CuAgAu. The magneto-resistive layer stack has a third magnetic layer and a fourth magnetic layer which are separated from one another by a second non-magnetic intermediate layer, and the non-magnetic intermediate layer of the layer arrangement and the second non-magnetic intermediate layer of the magneto-resistive layer stack at least one of (a) are made of the same material and (b) have a substantially equal thickness. The magneto-resistive layer stack is situated directly on the layer arrangement.

Although Applicants do not necessarily agree with the merits of the rejection, to facilitate matters, claim 11 has been amended to recite that **the layer arrangement consists of a first magnetic layer, a second magnetic layer, and a non-magnetic intermediate layer separating the first magnetic layer and the second magnetic layer from one another**, and that **the magneto-resistive layer stack consists of a third magnetic layer, a fourth magnetic layer and a second non-magnetic intermediate layer separating the third magnetic layer and the fourth magnetic layer from one another**. Support for these amendments may be found, for example, on page 5, lines 4 to 6 and page 4, lines 5 to 9 of the Specification, as well as in Figure 1.

**None of the embodiments of the magnetoresistance effect device described in Sakakima et al. include both of the above-mentioned features.** In the embodiment shown in Figure 24 of Sakakima et al., the Office Action considers the top four layers consisting of a soft magnetic film (103), a nonmagnetic film (102), a second soft magnetic film (103) and a second nonmagnetic film (102) to constitute a magnetoresistive layer stack. However, **the latter, above-mentioned feature of claim 11 only provides for a magnetoresistive layer stack consisting of a non-**

**magnetic layer between the first and second magnetic layers, and not an additional non-magnetic layer beneath the lower magnetic layer.** In addition, the Office Action considers the seven layers (101, 102, 101, 102, 103, 102, 103) situated directly beneath the “magnetoresistive layer stack” to constitute a layer arrangement, whereby layers (101, 102, 101) are considered to constitute a first magnetic layer, subsequent layer (102) is considered to constitute a nonmagnetic intermediate layer, and subsequent layers (103, 102, 103) are considered to constitute a second magnetic layer. However, **the former, above-mentioned feature of claim 11 provides a layer arrangement consisting of two magnetic layers separated by one non-magnetic layer, whereas the “layer arrangement” of Figure 24 includes a total of four magnetic layers (101, 101, 103, 103) and three nonmagnetic layers (102, 102, 102).** Furthermore, in the embodiment shown in Figure 1B of Sakakima et al., the Office Action considers the group of four layers situated directly beneath the top nonmagnetic film (2), i.e., hard magnetic film (1), nonmagnetic metal film (2), soft magnetic film (3) and nonmagnetic film (2), to constitute a magnetoresistive layer stack. However, **the latter, above-mentioned feature of claim 11 only provides for a magnetoresistive layer stack including a non-magnetic layer situated between the first and second magnetic layers, and not for an additional non-magnetic layer beneath the lower magnetic layer.** Furthermore, in the embodiment shown in Figure 2B of Sakakima et al., the Office Action considers the uppermost group of layers consisting of soft magnetic film (3), nonmagnetic metal film (2) and magnetic film (3') to constitute a magnetoresistive layer stack, and a series of layers directly beneath the “magnetoresistive layer stack,” i.e., hard magnetic film (1) (“first magnetic layer”), nonmagnetic metal film (2) (“non-magnetic intermediate layer”) and soft magnetic film (3) (“second magnetic layer”), to constitute a layer arrangement. However, **as is apparent from Figure 2B, the “layer arrangement” includes a further magnetic film (3') situated between hard magnetic film (1) and nonmagnetic metal film (2), and therefore includes a total of three magnetic layers instead of the two magnetic layers provided by the former, above-mentioned feature of claim 11.** Moreover, Haratani et al. describes a spin valve magneto-resistance device (10) including a nonmagnetic layer (16) sandwiched by free and pinned magnetic layers (12, 18), but does not cure the deficiencies of Sakakima et al. with respect to the above-mentioned features of claim 11. Accordingly, it is respectfully submitted that the

combination of Sakakima et al. and Haratani et al. does not render unpatentable claim 11 and its dependent claims 20 and 21 for at least these reasons.

Claims 13 and 22 include features analogous to claim 11 and have been amended in a manner analogous to claim 11. Accordingly, it is respectfully submitted that the combination of Sakakima et al. and Haratani et al. does not render unpatentable claim 13, claim 22 and its dependent claim 23 for at least the reasons set forth above.

In view of the foregoing, withdrawal of this rejection is respectfully requested

#### **IV. Rejection of Claims 14, 18 and 19 Under 35 U.S.C. § 103(a)**

Claims 14, 18 and 19 were rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Sakakima et al., Haratani et al. and U.S. Patent No. 6,611,034 ("Den"). It is respectfully submitted that the combination of Sakakima et al., Haratani et al. and Den does not render these claims unpatentable for at least the following reasons.

Claims 14, 18 and 19 ultimately depend from claim 11 and therefore include all of the features of claim 11. In addition, as set forth in detail in Section III of this response, neither Sakakima et al., nor Haratani et al. discloses, or even suggests, all of the features of claim 11. Furthermore, Den describes a magnetic device and a solid-state magnetic memory and shows cross-sectional views of a laminated magnetic material in the magnetic device. However, Den is not asserted to disclose or suggest, nor does Den disclose or suggest, any of the features of claim 11 not disclosed or suggested by the combination of Sakakima et al. and Haratani et al. Accordingly, it is respectfully submitted that the combination of Sakakima et al., Haratani et al. and Den does not render unpatentable claims 14, 18 and 19, which depend from claim 11.

In view of the foregoing, withdrawal of this rejection is respectfully requested.

**V. Conclusion**

In light of the foregoing, Applicants respectfully submit that all pending claims are in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully submitted,

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